Strategy Research Project

THE ARMY'S QUEST FOR A NEW GROUND COMBAT VEHICLE

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USAWC CLASS OF 2010

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
25-03-2010	Strategy Research Project	

4. TITLE AND SUBTITLE

The Army's Quest for a New Ground Combat Vehicle

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Ms. Helen M. Lardner

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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Department of Academic Affairs

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army War College
122 Forbes Avenue
Carlisle, PA 17013

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Distribution A: Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

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15. SUBJECT TERMS

Acquisition, Transformation, Army Modernization

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. TELEPHONE NUMBER** *(include area code)*
UNCLASSIFED	UNCLASSIFED	UNCLASSIFED	UNLIMITED	36	

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This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The U.S. Army War College is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

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ABSTRACT

AUTHOR: Ms. Helen M. Lardner

TITLE: The Army's Quest for a New Ground Combat Vehicle

FORMAT: Strategy Research Project

DATE: 25 March 2010 WORD COUNT: 5,946 PAGES: 36

KEY TERMS: Acquisition, Transformation, Army Modernization

CLASSIFICATION: Unclassified

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THE ARMY'S QUEST FOR A NEW GROUND COMBAT VEHICLE

> To truly achieve victory as Clausewitz defined it—attaining a political objective—the US military's ability to kick down the door must be matched by its ability to clean up the mess and even rebuild the house afterward.[1]—Robert M. Gates, US Secretary of Defense

On April 6, 2009, Secretary of Defense Robert Gates delivered his budget recommendations for the fiscal year 2010 defense budget.[2] Among them was cancellation of the Manned Ground Vehicles portion of the Army's Future Combat Systems (FCS) program. He said the design for the family of manned ground vehicles did not reflect the lessons of counterinsurgency in Iraq and Afghanistan. He also stated that he was troubled by the terms of the FCS contract. At the same time, he acknowledged that an Army vehicle modernization program designed to meet the needs of the full spectrum of conflict was essential and recommended its relaunch.[3]

FCS was the materiel centerpiece of Army Transformation efforts. It consisted of 18 manned and unmanned systems tied together by a communications network.[4] The manned vehicles were intended to replace heavy platforms with lighter, more deployable, modular vehicles on a common chassis.[5] In addition, the systems included advanced sensors as well as robotic air and ground vehicles.[6] This paper will explore the reasons the Army pursued FCS, discuss its history as part of Army Transformation, including risks taken to pursue the program and the fact there has been no overarching vision since then and end with a discussion of the current modernization efforts and the fact that the Army is going toward a heavy platform replacement approach, not what General Eric Shinseki originally envisioned.

Secretary Gates recommended significant changes to modernization programs pursued by other services. Among them were termination of the Transformation

Satellite (TSAT) program, cancellation of the airborne laser, capping the buy of the Navy's DDG-1000 ship at three while restarting the DDG-51 Aegis Destroyer program and stopping the Air Force procurement of F-22s at 183. He said that in his decisions, he was guided by the need to rebalance programs "to enhance our capabilities to fight the wars we are in today and the scenarios we are most likely to face in the years ahead."[7] In order to do this, he said we must overhaul the Department of Defense approach to procurement, acquisition and contracting.

Following this announcement, the Secretary delivered speeches to the Service War Colleges to explain, in greater detail, the reasons behind his recommendations. His overarching message to all the Services was look at joint missions first. Do not look for a Service specific solution when the required capability sought exists in another Service. Look for programs that can be used across a range of missions.[8] Take the 80 percent solution and get away from long development cycles, especially when technology and geopolitical changes outpace the delivery of the capability.[9]

With respect to the FCS manned ground vehicle program (MGV), he consistently stated that the program, developed nine years prior, did not adequately reflect lessons of counterinsurgency and close quarters combat in Iraq and Afghanistan.[10] He stated that the Army "must have a new, modernized fleet of combat vehicles to replace the Cold War inventory."[11] He promised to protect the out year funding for a new vehicle modernization program. The Fiscal Year (FY) 2010 budget reveals that he kept his promise.[12]

Prior to the April announcement, Secretary Gates gave several clues indicating that he believed all the Services were, to a certain extent, wishing away the conflicts in Iraq and Afghanistan while focusing on preparing for future, more conventional conflicts.[13] He said Pentagon bureaucracy, as well as Congress and the defense industry, focused on support for those programs almost to the exclusion of the capabilities needed to win the wars we are in.[14] Further, while the United States may not wage conflicts such as the two in which it is currently engaged, the future strategy is to employ indirect approaches through building partner capacity as well as security force assistance in order to prevent problems from turning into situations requiring full scale military intervention.[15]

After he looked at the capabilities the United States has and needs within the context of the Service's procurement programs, the Secretary observed that, although state of the art systems were needed, the types of situations it will most likely face "begs the question of whether specialized, often relatively low tech equipment for stability and counterinsurgency missions is also needed."[16] Given this context, his April announcements were consistent with the environment and needs he articulated.

Army Transformation

Following the Cold War and the first Gulf War, the Army decreased from eighteen active duty divisions to ten, and the budget deceased as well. Rather than modernize with new equipment, the Army chose to maintain its fleet of heavy equipment.[17] Three new programs, the M8 Armored Gun System, the Future Scout and Cavalry System (a joint program with the United Kingdom), and an assault breacher platform called "Grizzly" were all started and then cancelled.[18] The last two were cancelled in order to fund Army transformation.[19]

In the mid-1990s, when the Army tried to move equipment quickly to the Balkans, it bogged down and was unable to get into the fight.[20] In December 1995, when the Army tried to move the 1st Armored Division across the Sava River to Bosnia as part of Task Force Eagle, it waited ten days until Army engineers built a pontoon bridge. In April 1999, the delays in launching Task Force Hawk into Kosovo, among other things, resulted in its not engaging in direct combat.[21] Task Force Hawk was an effort to move Apache helicopters, tanks, artillery and engineering equipment, as well as its logistics tail from Germany through Italy to Albania to engage Serbian Forces in Kosovo.[22]

In 1999, General Eric Shinseki, who had been the Commanding General, United States Army Europe and as well Commander of NATO Stabilization Force in Bosnia-Herzegovina prior to becoming Army Chief of Staff (CSA), decided to pursue the FCS concept as part of Army transformation. He announced his plans at the annual meeting of the Association of the United States Army in October 1999.[23] His vision was to enable divisions to "dominate across the full spectrum of operations by providing them the agility and the versatility to transform rapidly from one point on that spectrum to another with least loss of momentum."[24] Essential to this vision was the reduction of the logistics footprint. At the time, 90 percent of the lift required to deploy the Army was dedicated to moving the logistics tail.[25] He recognized that the Army had to deploy to trouble spots faster than the adversary could act and also with enough lethality to win any conflict.

To that end, he set a goal of a combat brigade equipped with Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance ("C4ISR") that could deploy anywhere in the world within 96 hours, a division on the ground within

120 hours and five divisions on the ground within 30 days. He reasoned that a capability like this provided a deterrent capability due to its speed and demonstration of combat power. If that deterrence failed, the same combat power could prosecute a war and win. In order to bridge the gap between the Army of 1999 and the future he articulated, GEN Shinseki announced the purchase of "off the shelf" interim equipment. This led to the Stryker vehicle purchase as "Interim Armored Vehicles." He said the interim equipment would initially go a brigade at Ft. Lewis, Washington for developing doctrine, organizational design and leader training resulting in the transformed Army or the "Objective Force."[26]

General Shinseki amplified his ideas in an October 2000 Frontline interview for the Public Broadcasting System's Future of War series.[27] He pointed out that Operation Desert Storm had been successful because, Saddam Hussein delayed attacking further. This provided the Army six more months to deploy heavy divisions to ports and airfields in Saudi Arabia where the United States was granted access. He said that areas like Somalia, Haiti, Panama, Bosnia, Kosovo and East Timor required the ability to move quickly and have sufficient capability on the ground to hold a crisis with the intent of returning the area to stability.[28] He saw that "complicators" like organized crime, narcotrafficking, terrorism and weapons of mass destruction provided our enemies with a capability that the Army doctrinally did not have a way to address.[29]

In March 2000, in his prepared testimony for the Airland Subcommittee of the Senate Armed Services Committee, General Shinseki said the Army Transformation Strategy would "result in an Objective Force that is more responsive, deployable, agile, versatile, lethal, survivable and sustainable than the present force."[30] The Army had "to

gain strategic flexibility" and "become strategically dominant at every point on the spectrum of operations."[31]

At this point, the Army was broken into three separately described types of Force: Legacy, Interim and Objective. The Legacy Force consisted of heavy divisions equipped with Abrams and Bradleys, the Interim Force, equipped with Strykers that were slated to leave the Army inventory with the arrival of the Objective Force, equipped with FCS.[32]

FCS Acquisition

In February 2000, the Army Acquisition Executive (AAE) and the Director of the Defense Advanced Research Projects Agency (DARPA) entered into an agreement to collaborate on the evaluation and competitive demonstration of the Future Combat Systems.[33] The jointly funded program would create a system whose attributes were:

- Network Centric Architecture
- Robotics integrated into the force
- Increased reliance on extended range engagement
- Capable of air mobile operations

The program, funded by the Army and DARPA through Fiscal Years (FY) 00-05, called for multiple contracts to develop designs and demonstrator fabrications. This phase of the original acquisition strategy was to conclude in 2006 with the construction of FCS demonstrators. In May 2000, DARPA and the Army chose four contractor teams to conduct concept designs over a 24 month period.[34] Under the terms of the agreement, the contractor and the government shared the costs of developing prototypes. This type of contract is known as a Section 845/Other Transaction Authority

(OTA) for Prototypes.[35] Each team was to develop two design concepts, both of which would provide deployability, agility, versatility, lethality, survivability and sustainability (the "ilities") for the objective force. The first design concept was for a for a network enabled distributed force that included a manned command and control personnel carrier, a robotic direct fire system, a robotic non-line-of-sight system, an all weather robotic sensor system and other layered sensors. The second concept was for the team's own approach to a system of systems.

Following this phase, DARPA and the Army planned to select two teams to prepare a detailed FCS design for the best concept. After that, a single contractor team was to build and test an FCS demonstrator. This demonstration and experimentation effort would last through FY 2006, at which time the Army would decide whether to proceed into the Engineering and Manufacturing Development phase of the program. Fielding would begin in 2012.[36]

This deliberate development pace was accelerated by the Army in 2001, most likely as a result of the events of September 11.[37] Rather than winnowing down to two design concepts, in March 2002, DARPA conducted a competition for a Lead Systems Integrator (LSI) and announced that Boeing and Science Applications International Corporation (SAIC) would develop the FCS systems.[38] The LSI concept was pitched to the Army and Congress by Lockheed Martin with the argument that the Army had reduced its acquisition professional staff and the civilian work force to such a low level in the Army Research, Development and Engineering Centers that it needed someone else to pull the whole thing together. Lockheed Martin proposed the effort be sole sourced to it.[39]

Instead, the LSI work was competed based on the concept of a future Brigade Combat Team (BCT) and the competitors plan to take that concept through to Milestone B which is the official initiation of a major program. At this point, there was no formal requirement for FCS. In addition to performing the tasks of managing and integrating all the program's parts, the LSI acted as a general contractor for the government, engaging the best of industry to work on integrated hardware/software solutions.[40] Also, because the program crossed so many internal Army organizational lines, e.g., Armor, Artillery, Infantry, Signal etc., it made sense for someone outside the organization to manage the different camps.[41] During this Concept and Technology Development (CDT) phase, the LSI worked with DARPA and the Training and Doctrine Command on refining requirements.

The FCS concept included manned and unmanned combat systems, munitions, guns, missiles, network protocols, various sensors, command and control and decision aids.[42] The centerpiece of this formation was the Soldier. According to the Army/DARPA program manager at the time, the program would be considered a success "[w]hen the Soldier is trained to be quick, organized and ready to perform a wide array of missions and survive."[43]

The FCS Operational Requirements Document (ORD) was approved May 13, 2003. It contained seven Key Performance Parameters (KPPs): Joint Interoperability, Networked Battle Command, Networked Lethality, Transportability, Sustainability/Reliability, Training and Survivability. KPPs guide the efforts of a program.[44] They are the minimum attributes or characteristics considered most essential for an effective military capability.[45] The KPP that appeared to receive the

most attention at the time was “Transportability” because it was thought to require the system to fit within a C-130 airframe. The KPP itself stated that the system must be transportable by air, sea, highway and rail to support inter-theater deployment as well as intra-theater operational maneuver.[46] The ability to move quickly to hot spots was critical to General Shinseki’s vision of a more deployable Army.

KPPs are used during operational testing. The system must perform to the KPPs. While the Transportability KPP did not specify that the platform fit into a C130, a Band 2 ORD requirement did. However, this is not a requirement that the system has to meet to pass the operational test phase. In the FCS program, Band 2 ORD requirements required CSA approval to change. This requirement was going to change per the request of the TRADOC Commander to the CSA at the end of 2007.[47] The request was an adjustment of the threshold requirement from “intra-theater transportable on C-130/C-17 aircraft” to “on C-17 aircraft.”[48]

The day after the ORD was approved, on May 14, 2003, the Defense Acquisition Executive (DAE) approved the program’s entry into the Milestone B, or the System Design and Demonstration (SDD) phase of development.[49] The SDD phase focuses on reducing integration and manufacturing risk, ensuring operational supportability, and demonstrating the system through prototypes or engineering development models.[50] The DAE’s Acquisition Decision Memorandum (ADM) approved the Army’s request to manage the program as a single Major Defense Acquisition Program (MDAP) with a single funding line.[51] The Army requested the single funding line because it gave the Program Manager the ability to move funding to various parts of the program as needed to ensure scheduled events took place in the right order. This was considered very

important to the program because there were so many parts and different technologies that had to be developed quickly that the PM needed the fiscal flexibility to cover the risks. Congress, however, did not approve this feature of the program. Instead, it approved two lines, one for FCS and one for the Non-Line-of-Sight-Cannon (NLOS-C) and its resupply vehicle. These funding lines expanded over time, complicating the development of the various components because of different funding buckets supporting different program efforts.[52]

The NLOS-C variant of the MGV was required by Congress.[53] The Army was to field the platform by 2010 and eight pre-production systems by the end of 2008.[54] After the cancellation of the Crusader, a short bridge contract was employed to migrate its technology advancements into the FCS program. With the mandate from Congress to field the platform ahead of the others, NLOS-C became the leader of the MGV development.[55]

The ADM also stated that because of the complexity of the program, the Office of the Secretary of Defense (OSD) planned to exercise special management oversight. OSD scheduled a Milestone B Defense Acquisition Board review for the following year, at which the Army would provide a status update on the critical technologies required for the program and a list of other items in the ADM. FCS is the only program that had the oversight of an annual Milestone B DAB.

The program's lead then shifted from DARPA to the AAE with a Brigadier General as the Program Manager (PM). The Army continued the LSI arrangement with Boeing and SAIC for the SDD phase of the program.[56] It also continued the OTA contract vehicle instead of the traditional Federal Acquisition Regulation (FAR) contract

typically used at this point in a program. From March 2003 through August 2003, the LSI awarded 23 subcontracts to awardees, later referred to as “One Team.”

Congressional perception of the LSI was not favorable. There was concern over the LSI fee arrangement and a perceived lack of government control and oversight. Secretary Gates saw the LSI fee as a “pass-through” to acquire the vehicles as opposed to buying them directly from a contractor as with the MRAP procurement. He also noted that the performance fee was guaranteed to the LSI at the critical design review (CDR) which determines whether the design of a system satisfies performance and engineering requirements. The General Accountability Office expressed this in a report to Congress. It stated that it was difficult to tie the contractor’s performance to actual outcomes. It also criticized OSD for not providing sufficient oversight to the program.[57]

While the project was DARPA managed, the LSI, upon a recommendation from the Army, began a sole-source arrangement with General Dynamics (GD) and United Defense Limited partnership (UDLP now BAE) to start designing the manned ground vehicle portion of the program.[58] GD and United Defense agreed to a 50:50 split, but with GD in the lead on designing the FCS family of manned vehicles with common elements.[59] This arrangement allowed the program to stay on schedule and provided the two major manufacturers of armored vehicles in the country with enough work to protect the industrial base.[60] This split between the two armored vehicle industry players as well as the fee arrangement with the LSI were also cited by Secretary Gates, in testimony to Congress, as a reason he terminated the MGV portion of FCS.[61]

The program employed DoD's evolutionary acquisition model which allowed for upgrades through the spiral development process.[62] The program deferred some requirements definition in order to use initial test data for clarification and refinement. The refined requirements would then be part of the Capability Development Document required for Milestone C. GAO also objected to this type of weapons system development. The Army responded by moving toward a phased-development approach.

As envisioned, FCS systems were connected by means of an advanced network architecture that would permit connectivity with other services, situational awareness and understanding, and synchronized operations.

The Systems included:

- Unattended ground sensors (UGS);
- Non-Line-of-Sight Launch System (NLOS-LS) and Intelligent Munitions System (IMS);
- Four classes of unmanned aerial vehicles (UAVs) which were organic to platoon, company, battalion and other echelons;
- Three classes of unmanned ground vehicles (UGVs):
    - the Armed Robotic Vehicle (ARV),
    - the Small Unmanned Ground Vehicle (SUGV), and the
    - Multifunctional Utility/Logistics and Equipment Vehicle (MULE);
- Eight types of manned ground vehicles;

- The network, and
- The individual soldier and his personal equipment and weapons.[63]

Three months after the program started, in August 2003, new Army Chief of Staff, General Peter Schoomaker renamed the Objective Force as the Future Force and shifted the focus to the fielding of useful FCS program to fielding capabilities as soon as they became available instead of waiting a decade or more until they could be integrated into other FCS platforms and technologies under development. This led to the first of three program restructuring activities the program would undergo in its six years in SDD.

The wars in Iraq and Afghanistan injected a sense of urgency into the program started during peacetime when the Army thought there was time to transform.[64] As it faced the realities of prolonged engagements in Afghanistan and Iraq, the Army tried to harvest the goodness coming from the program. In addition, as budgets grew tighter, FCS presented a large pot of money from which Congress could draw in order to pay bills. Congress reduced the program's budget approximately 10% per year in 2006, 2007 and 2008.[65] Each time Congress did this, the program office took about nine months to replan the program and reestablish a program baseline.[66]

The chart on the next page depicts the program's restructuring history starting with the Milestone B decision in May 2003. It was restructured in 2004-2005, 2006-2007 and in 2008-2009.

FCS Program History

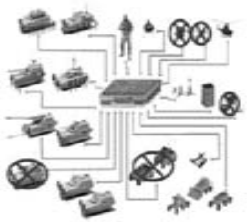
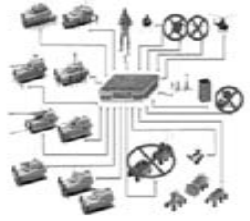
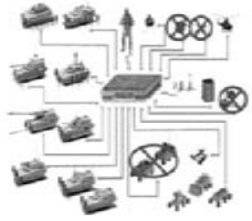
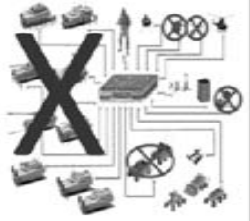
	2003 (MSB)	2004-2005 (POM 06-11)	2006-2007 (POM 08-13)	2008-2009 (POM 10-15)	JUN 2009
	FCS "Minus" / "Big Bang"	FCS "Spin Out/Extension"	FCS "Adjusted"	FCS	FCS Cancelled
Major Reviews	MSB FY03	System-of-Systems Functional Review FY05	Initial Preliminary Design Review FY 06 / Engineering Maturity1	System-of-Systems Preliminary Design Review FY 09 / MDAB	
Requirements	FCS ORD JROC Approval Apr 03		FCS ORD v2.0 Approval Apr 06	FCS CDD v1.0 JROC Approval (Staffing) ➡ FY09	
Program	 13+1+1 w/5 deferred systems FMRV, CLII & CLIII UAS, ARV & IMS - APB Signed 17 May 03 - Army Transition to IBCT	 Program Restructure: 18+1+1 - Restored 5 deferred systems - Contract transition to OTA to FAR - Program into Integration Phrases - Added 4 Spin Outs	 Program Restructure: 14+1+1 - Delete 2 UAV (CLII & CLIII) - Delete ARVs - Separate IMS from core program - Consolidated Spin Outs (4 to 3 SOs) - AETF at Ft. Bliss, TX	 Program Changes - Class I and SUGV to Spin Out IBCT - Increased MGV Survivability rqmts - Added Network IA capabilities - Changed SO1 from H BCT to IBCT - Update to qtys based on new URS	 Program Changes -FCS Program Cancelled -MGV Terminated -FCS SoS Engineering Terminated
PEs/Proj	1/1	3/13 3/8	4/9 4/9	9/9 9/9	
Congressional Cuts (Net Adj)		FY05 ($268.2M)	FY06 ($236.0M) FY07 ($319.1M)	FY08 ($206.0M) FY09 TBD	
Cost Estimate	APB (FY03C$): RDTE: $18.1B Proc: $59.1B AUPC: $3.9B per BCT PAUC: $5.2B per BCT Life Cycle Cost Estimate (FY03C$): Program Office: $149.3B CAIG: $175.3B 2 BCTs/Yr	APB (FY03C$): RDTE: $26.7B Proc: $92.8B AUPC: $6.2B per BCT PAUC: $8.0B per BCT Life Cycle Cost Estimate (FY03C$): Program Office: $229.8B CAIG: $295.0B 1.5 BCTs/Yr	Updated Program Estimate (FY03C$): RDTE: $25.1B Proc: $87.5B AUPC: $5.8B per BCT PAUC: $7.5B per BCT Life Cycle Cost Estimate (FY03C$): Program Office: $211.0B CAIG: no estimate 1 BCT/Yr	Updated Program Estimate (FY03C$): RDTE: $27.1B Proc: $98.4B AUPC: $6.6B per BCT PAUC: $8.4B per BCT Life Cycle Cost Estimate (FY03C$): Program Office: TBD - in progress CAIG: no estimate 1 BCT/Yr	
	Then Year $92B RDTE $ 20B Production $ 72B	Then Year $161B RDTE $ 31B Production $ 130B	Then Year $162B RDTE $ 30B Production $ 132B	Then Year $179B RDTE $ 32B Production $ 147B	

Figure 1

"Selling" Army Transformation

Typically, when a new system is developed, there is an Army branch proponent for it. For example, the proponent for the Crusader was the Field Artillery School, the proponent for the Comanche was Aviation School and the proponent for the Abrams tank was the Armor School. FCS did not have a single branch proponent. This was important because, as a result, there was not universal support in the Army for the idea. In order to create a proponent, as well as for other reasons, in November 2000, General Shinseki established an entity entitled Task Force Future Combat Systems. Lieutenant General John Riggs initially led it while its name was later changed to Objective Force Task Force (OFTF).

The Task Force's fundamental purpose was to accelerate the progression of FCS to production status and enable decision making by senior leadership of the Army. Toward that end, the task force was given responsibility for establishing a team to resolve issues, operational and system design concepts and technology/requirements tradeoffs, seek assistance and better coordinate collaboration.[67]

A lesser included mission of OFTF was to "sell" Transformation and FCS. The office was responsible for developing products to inform OSD, the Army and the Congress about the Army vision. It was responsible for the rhetoric stating "We will see them first, make the right decisions before they do, and decisively engage and destroy them first. In short, we will make every engagement an ambush."[68] The "see first, understand first, act first and finish decisively" phrase became associated with FCS in such a way that many believed that the system would provide the Soldier the ability to do this with little exercise of judgment on his or her part.

In spite of these efforts, not all Army, industry or congressional parties were content with the direction the Army was going. One Team industry representatives continued to actively engage members of congress to preserve existing production lines, while offering sole-source solutions to Army modernization. Congress and think tanks distrusted of the network, combined with the independent industry engagements, created an insurmountable constituency against FCS among Professional Staff Members in congress.[69] In addition, the Armor School Commandant, while praising the Mounted Combat System variant of the MGV platform, was planning on moving ahead with a new version of the Abrams tank for the Heavy Brigade Combat Team.[70]

Army Future Concepts and Vision

Since General Shinseki's 1999 announcement detailing his vision of Army Transformation, subsequent CSAs have not announced a vision for the future Army either because they were content with the direction or because of the operational tempo consuming the Army since September 2001. Army stakeholders, including OSD and Congress look to a CSA vision in order to gauge support for prior CSA's goals and sometimes to find billpayers to fund new initiatives. The absence of articulated support is often seen as no support.

The Army's Training and Doctrine Command (TRADOC) publishes Capstone Concepts which provide a discussion of how the Army sees its future. A concept is not an Army vision; rather, it is general idea derived or inferred from specific instances or occurrences. Capstone Concepts are based on research, wargaming, experimentation and operational lessons learned and intended to shape not only future doctrine, but also organization, training, material, leadership and education, soldiers, and facilities.

Concepts reach out beyond the POM in order to look at what may be possible. In the past 20 years, the Army has published three such concepts: One in 1994, one in 2005 and the most recent, in 2009.[71] The 1994 Concept states that it is not doctrine, but rather a document of ideas for it is ideas that lead change for the Army.

The 2005 Concept emphasized the need for the Army to respond seamlessly to any conflict. In order to perform against threats and volatile conditions, the Army would need the ability to employ a combination of seven key operational ideas:

- *Shaping and Entry* addressed the regional condition setting, and shaping the battlespace
- *Operational Maneuver over Strategic Distances* enables the force to deter or promptly engage an enemy from positions of advantage.
- *Intratheater Operational Maneuver* is the ability to extend the reach of the joint force commander
- *Decisive Maneuver* is the need for a lethal combined arms force.
- *Distributed Support and Sustainment* to maintain freedom of action and provide continuous sustainment of committed forces
- *Concurrent and Subsequent Stability and Support Operations*, first to secure the results of decisive maneuver during operations and then to secure the peace
- *Network-enabled Battle Command*: the network and the leadership to operate in a networked environment.

The concept contained assumptions important to the envisioned environment. For example, it made clear that technology alone did not constitute transformation. Its

Forward stated that the Army's most critical asset is not technology, but the critical thinking of our Soldiers and leaders."[72]

Successful Army and joint transformational capabilities were also required for the Army Future Force envisioned in the concept. Those capabilities included leaders would could operate in an environment of uncertainty and rapidly changing operational conditions; a knowledge-based C4ISR network of networks vertically and horizontally integrated from strategic to tactical level; new strategic operational lift capabilities; a versatile modular force mix of capabilities that could be flexibly combined for any contingency; FCS BCTs as a component of the Future Force capable of implementing all aspects of the force, particularly intratheater operational maneuver, logistics transformation to enable to Future Force to operate within austere theaters without building a heavy logistics structure; and parallel development of joint concepts, capabilities and enablers.[73]

The concept, while looking toward the future environment, also recognized issues relevant to current operations in Iraq and Afghanistan by stating the need for knowledge "also encompasses understanding and appreciation of the cultural, ethnic, political, tribal, religious and ideological factors influencing the behavior of enemies, allies and neutrals."[74] Further, it recognized that in the unconventional and stability environments, cultural and social elements of situational understanding would be more significant and require human rather than technical resources.[75] It did not assume the perfect situational understanding that some of the hyperbole associated with FCS did. Rather, it stated that information superiority would be a contest, not "an advantage to be taken for granted."[76]

TRADOC published the most recent Capstone Concept in December 2009 with its focus on adaptability in persistent conflict. The timing for its publication may have been because underlying assumptions of some of the concept are further off than envisioned, or because the Manned Ground Vehicle portion of FCS was stopped, or possibly because the Army is not focused on a strategic vision, or because the Army believed that it must respond to Secretary Gates by abandoning the future for the current. The background portion of the latest concept suggests that the transformational thinking shaping earlier doctrine, organization and modernization had not materialized and therefore, this concept highlights the enduring "need for Army forces to fight under conditions of uncertainty and complexity."[77] Carl von Clausewitz first described the fog and friction of war two centuries ago in his classic *On War* in which he emphasized strategy as an evolving plan. Rather than focus on key ideas shaping the future, the 2009 Concept explains how to achieve operational adaptation in a way that is doctrinal in nature as opposed to conceptual. *Doctrine is what the military believe about the best way to conduct military affairs*.[78]

TRADOC representatives presented the concept at the Winter Symposium of the Association of the United States Army. Its principal author, BG H.R. McMaster stated that the "future will abide firmly within the realm of uncertainly." Therefore, "you build a different force than you would if you felt that technology would be able to lift the fog of war."[79] This statement describes the reality that Soldiers have always faced in conflicts past and future. It may be a reaction to the "see first, understand first, act first, finish decisively" language used in FCS marketing efforts discussed earlier. It does not appear to take into account advantages realized through technology inserted into

Afghanistan and Iraq, e.g., Blue Force Tracking, air and ground robots and advanced body armor.

The central idea of operational adaptability is described as quality Army leaders and forces exhibit based on critical thinking, comfort with ambiguity and decentralization, willingness to accept prudent risk and an ability to rapidly adjust.[80] It encourages forces to develop situations through action based on the fact that technology cannot deliver everything that forces and leaders must learn.[81] This is an overstatement. Nothing in doctrine suggests that technology will deliver cognitive skills.

The last portion of the most recent concept discusses core operational actions the Future Army must conduct. They are:

- *Conduct security force assistance—this includes providing indigenous units with equipment, as well as developing effective and sustainable institutions*.
- *Shaping and entry operations—establishing forward bases , developing sustainment capabilities and in so doing and relying on joint air and sealift to move the Army.*
- *Full spectrum operations—offensive, defensive, stability and civil support operations in order to seize, retain and exploit the initiative.*
- *Conduct overlapping protection operations—continuous reconnaissance to identify and preempt threats while defending and protecting vital assets*
- *Distributed support and sustainment—continuous uninterrupted flow of personnel, supplies, equipment and units into and throughout the theater of operations.*

- *Network enabled mission command—taking advantage of network capabilities while ensuring forces and leaders conduct operations with the concept of mission command.*

Absent from this concept is the need for operational maneuver from strategic distances which was the main ambition of General Shinseki's vision. The idea was that in moving an Army to global emergencies, speed was vital. Lighter platforms would enable this speed because they could move more quickly through strategic air or sea lift. In addition, they would take less time to repackage and reassemble. This may be a result of the recent experience of current leaders who after nine years in contact in Counterinsurgency Operations (COIN) did not have to worry about how their assets and supply chain got to them because they were already there.

In the absence of an overarching vision of the future and with new concept that has doctrine for practical application now, the Army is headed for a modest heavy force and platform replacement and not a strategically mobile or innovative future force.

Army Modernization Today

The Army of the future is getting heavier, adding more age and weight to existing platforms rather than transforming to a newer, lighter and more deployable force. It is doing so without a strategic vision, but rather with an image of persistent conflict. General George Casey said recently, "[s]uffice it to say, our view of the environment has not significantly changed, and it's persistent conflict." [82]

General Casey described an operational environment as one of persistent conflict for the next decade, where the United States would continue to be enmeshed in a long-term ideological struggle with global extremist terrorist networks. As well,

international trends were "more likely to exacerbate rather than ameliorate" the problems. Global trends included globalization and the proliferation of technology.[83]

The systems harvested from the FCS program: robots, sensors, NLOS-LS and the network capabilities will assist in countering this type of threat. Another benefit from the FCS program was generated by the FCS Organizational and Operational Plan (O&O) which provided the operational concept for the unmanned and unmanned teaming employed in Iraq by Task Force ODIN, an aviation battalion, chartered specifically to counter IEDs.[84] These technologies were only in their infancy ten years ago; now they seem routine.[85]

The wars in Iraq and Afghanistan generated a future Army equipped with heavier not lighter vehicles. The Mine Resistant Ambush Protected (MRAP) is the vehicle of choice for moving Soldiers and Marines in IED-laden landscapes in Iraq. The MRAP was purchased without traditional DoD 5000 series oversight and so far, the US has put almost $26 Billion dollars into the program. While they are effective in protecting Soldiers and Marines from the IED threat along improved roads, they have had some problems. Soldiers who travel on them in the rough terrain of Afghanistan call them “too big, too heavy and too immobile.”[86]

There are five different vendors producing some 32 variants MRAP vehicles which create significant logistics issues.[87] Key components of the vehicles such as transmissions and engines are different for each variant. In addition, the MRAP is not expeditionary because of the logistics requirements and shipboard and air transportability issues.[88] In Afghanistan, the MRAP purchased for Iraq is too top-heavy so an All-Terrain variant is required.

In Afghanistan, the Marines are experiencing great success with a version of the "Grizzly" breacher program, cancelled by the Army, to push through barriers and booby traps.[89] The Marines continued their version of the program with discretionary funds.[90] The Stryker, intended by General Shinseki to be an "off-the-shelf" system that would not be part of the transformed Army is now undergoing upgrades as a permanent system.[91] The Paladin howitzer built in the early 1960s, was expected to be replaced by the Crusader (cancelled), and then the NLOS-C (cancelled), is now getting an upgrade so it can last until 2050.[92] This, plus the Lightweight 155 cannon comprise the Army's ability to conduct suppressive fires.

The Abrams tank is getting upgrades and the future Army will have two variants of the system, the M1A1 Situational Awareness (SA) and the M1A2 (System Enhancement Program (SEP) v2.[93] Resetting an Abrams to zero miles zero hours, without upgrades, costs approximately $3.3 million dollars. Upgrading it to the latest version is $5.2 million dollars.[94]

The Army is developing a new Ground Combat Vehicle (GCV) to replace its two infantry carriers, the M113 and the Bradley Fighting Vehicle. The new platform's deign will have the under-belly protection of the MRAP, the off-road mobility of a Bradley and the urban and operational mobility of a Stryker.[95] It will have sufficient growth potential to ensure integration of upgrades and new technologies.[96] The first vehicle is expected by FY 17. [97] The vehicle is expected to weigh between 35 and 40 tons.[98]

The Army for the foreseeable future is heavier and just as logistically burdened as the one that had such trouble moving to contact in the 1990s. In 1999, General Shinseki established mobility goals with a plan to achieve them. The latest version of

the Army Campaign Plan retains those mobility goals. Annex T states that the Army will deploy and employ a modular brigade in four days, three modular brigades and a division headquarters in ten days, nine modular brigades with a division headquarters within 20 days, and fifteen modular brigades in 30 days.[99] The difference is the Army has no plan to achieve them. In fact, the Army's current modernization efforts make those goals harder to attain than they were in 1999.

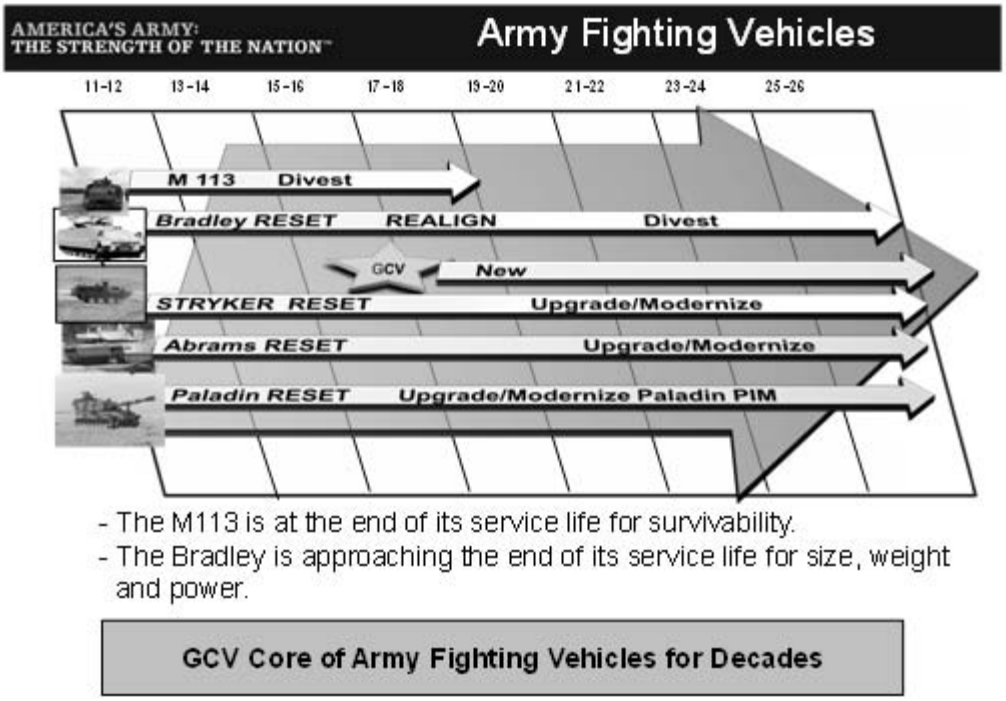


Figure 2

Endnotes

[1] Robert M. Gates, "The National Defense Strategy, Striking the Right Balance," *Joint Force Quarterly*, Issue 52, 1st Quarter 2009, 3.

[2] U.S. Secretary of Defense Robert M. Gates, "Defense Budget Recommendation Statement" (Arlington VA), as prepared for delivery, April 6, 2009.

[3] Ibid.

[4] Andrew Feickert, *The Army's Future Combat System (FCS): Background and Issues for Congress*, (Washington, D.C., Congressional Research Service, April 28, 2005), 1.

[5] Ibid.

[6] Ibid.

[7] Robert M. Gates, Defense Budget Recommendation Statement.

[8] U.S. Secretary of Defense Robert M. Gates, remarks as delivered, Army War College (Carlisle, PA) April 16, 2009. At the Army War College, Secretary Gates said "the FCS vehicle program was, despite some adjustments, designed using the same basic assumptions as when FCS was first designed nine years ago. The premise behind the design of these vehicles was that lower weight, greater fuel efficiency, and, above all, near-total situational awareness, would compensate for less heavy armor – a premise that I believe was belied by the close-quarters combat, urban warfare, and increasingly lethal forms of ambush that we've seen in both Iraq and Afghanistan, and are likely to see elsewhere as other adversaries probe for and find ways to turn our strengths against us."

[9] U.S. Secretary of Defense Robert M. Gates, remarks as delivered, Maxwell-Gunter Air Force Base (Montgomery, AL) April 15, 2009.

[10] U.S. Secretary of Defense Robert M. Gates, remarks as delivered, Naval War College (Newport, RI) April 17, 2009.

[11] Robert M. Gates, remarks as delivered, Army War College.

[12] "DoD Budget Supports New Capabilities for Army Infantry Brigades," *Defense Daily*, Feb. 3, 2010, in Proquest (accessed Feb., 4, 2010). The BCT Modernization Program includes four elements: incrementally fielding capability packages that best meet the needs of Soldiers; modernizing the Network to take advantage of technology upgrades; developing and fielding a new Ground Combat Vehicle (GCV) that meets the requirements of the 21st Century Army; and integrating Mine Resistant Ambush Protected Vehicles (MRAPs) into our formations and programs. Procurement of $682.7M buys capability packages to enhance two IBCTs to be fielded in FY12. The PB11 RDTE request of $1.6B continues support and testing for the Increment 1 and development of Increment 2. These increments will provide additional capabilities and advances in networking and battle command to the remaining IBCTs. The Army Budget Request—Fiscal year 2011 (February 1, 2010) Brigade Combat Team Modernization comprises the largest dollar amount in the Research Development and Acquisition budget at $3,185M.

[13] Robert M. Gates, *Joint Force Quarterly,* 3.

[14] Ibid.

[15] Ibid.

[16] Ibid., 6. Secretary Gates published a similar article in *Foreign Affairs*. In that article he said, that "[w]hen it comes to procurement, for the better part of five decades, the trend has gone toward lower numbers as technology gains have made each system more capable. In recent years, these platforms have grown ever more baroque, have become ever more costly, are taking longer to build, and are being fielded in ever-dwindling quantities. Given that resources are not unlimited, the dynamic of exchanging numbers for capability is perhaps

reaching a point of diminishing returns" Robert M. Gates, "A Balanced Strategy: Reprogramming the Pentagon for a New Age," *Foreign Affairs* (New York) Jan/Feb 2009, in Proquest (accessed Feb. 4, 2010).

[17] Mackensie M. Eaglen and Oliver L. Horn, *Future Combat Systems: A Congressional Guide to Army Modernization*, (Washington D.C: The Heritage Foundation, Dec. 11, 2007), 3-4.

[18] Global Security.Org, Military, http://www.globalsecurity.org/military/systems/ground/m8-ags.htm; http://www.globalsecurity.org/military/systems/ground/fscs.htm; http://www.globalsecurity.org/military/systems/ground/grizzly.htm (accessed March 12, 2010). In the fiscal 1996 budget the Armored Gun System was slated to enter production. The Army's Armored Gun System was terminated in 1996, and the FY 97 budget abandoned the Armored Gun System program; FSCS was a joint development program between the US and the UK. The combined/harmonized draft ORD was approved in January 1998. A 07 July 1998 Memorandum of Understanding (MOU) between the United States and the United Kingdom established the US Future Scout and Cavalry System (FSCS) / UK Tactical Reconnaissance Armoured Combat Equipment Requirement (TRACER) program. The program was cancelled in order to pay for the FCS program; the GRIZZLY [initially designated the Breacher] was an armored vehicle designed to breach complex obstacles including mines, berms, wire, rubble, and tank-ditches. The GRIZZLY would breach obstacles with minimal preparation creating safe lanes for other vehicles in the dominant maneuver force with little or no loss in momentum. The GRIZZLY's obstacle clearing features include a full-width mine-clearing blade and a powered, extensible excavating arm.

[19] Ibid. The Fiscal Year 2001 Army budget request included decisions to restructure or "divest" a number of programs in order to provide some of the resources to support its transformation to achieve the ambitious deployment goals outlined in the October 1999 Army Vision. The restructured programs were the Crusader and the Future Scout and Cavalry System. The "divestitures" included Stinger Block II, Command and Control Vehicle (C2V), Grizzly, Wolverine, and the Army Tactical Missile System Block IIA. Funding for these programs was reallocated to fund the Army Vision transformation strategy.

[20] Andrew Feickert, *The Army's Future Combat System (FCS): Background and Issues for Congress,* 2, fn. 1. Many experts consider the Army's 1999 controversial Task Force (TF) Hawk deployment to Kosovo and Albania as the event that triggered the Army's transformation. Reportedly, the Army deployed a unit consisting of units from different divisions that had never trained together commanded by a command and control organization that was unable to conduct joint operations. The most often cited criticism was that it took more than 30 days to deploy TF Hawk, centered on 28 Apache attack helicopters, from bases in Germany to Albania; and, when they finally arrived, they were unable to conduct combat operations due to training and equipment deficiencies. The task force also consisted of mechanized maneuver and support elements competing for limited air lift insertion capabilities.

[21] John Gordon IV, Bruce Nardulli, Walter L. Perry, "The Operational Challenges of Task Force Hawk, *Joint Force Quarterly*, no. 29 (Autumn 2001-Winter 2002): 52 in Proquest (accessed March 24, 2010).

[22] Ibid.

[23] GEN Erik K.Shinseki, “Address to the Eisenhower Luncheon,” 45th Annual Meeting of the Association of the United States Army (Washington, D.C.) Oct. 12, 1999.

[24] Ibid.

[25] Ibid.

[26] Ibid.

[27] Frontline, “The Future of War: What’s New in the Face of War? And How Should the U.S. Prepare for It,” October 2000, linked from PBS Frontline http://www.pbs.org/wgbh/pages/frontline/shows/future/interviews/shinseki.html

[28] Ibid. Ten years later, Secretary Gates echoed GEN Shinseki in his *Foreign Affairs* article stating “Think of where U.S. forces have been sent and have been engaged over the last 40-plus years: Vietnam, Lebanon, Grenada, Panama, Somalia, Haiti, Bosnia, Kosovo, Afghanistan, Iraq, the Horn of Africa, and more. In fact, the first Gulf War stands alone in over two generations of constant military engagement as a more or less traditional conventional conflict from beginning to end. As General Charles Krulak, then the Marine Corps commandant predicted a decade ago, instead of the beloved "Son of Desert Storm," Western militaries are confronted with the unwanted "Stepchild of Chechnya." *Foreign Affairs*, Jan/Feb 2009.

[29] General Shinseki Frontline Interview.

[30] General Eric K. Shinseki, Chief of Staff, United States Army, Statement before the Airland Subcommittee, Committee on Armed Services, U.S. Senate, 106th Cong. 2nd sess. March 8, 2000, 6.

[31] Ibid.

[32] Ibid., 7-8.

[33] Dr. Frank Fernandez and Paul J. Hoeper, “Memorandum of Agreement for the Collaborative Demonstration Portion of the Future Combat Systems Between the Defense Advanced Research Projects Agency and the United States Army,” 28 February 2000.

[34] DefenseLink Release, “DARPA and Army Select Contractors for Future Combat Systems Program,” May 9, 2000 (accessed Feb. 17, 2010). The contractors were:

The Boeing Co., Phantom Works, Seattle, Wash. - Agreement amount (cost-shared with company): $23,299,998. Government share: $10,000,000;

Science Applications International Corp., McLean, Va. - Agreement amount (cost-shared with company): $12,830,470. Government share: $10,000,000;

TEAM FoCuS Vision CONSORTIUM, c/o Raytheon Co., Plano, Texas - Agreement amount (cost-shared with consortium): $14,000,000. Government share: $10,000,000;

Team Gladiator (TRW Inc., Carson, Calif.; Lockheed Martin Inc., Lockheed Martin Vought Systems, Dallas, Texas; CSC/Nichols Research, Huntsville, Ala.; Carnegie Mellon Research Institute, Pittsburgh, Penn.; Battelle Memorial Institute, Columbus, Ohio; IITRI/AB Tech Group,

Alexandria, Va.) - Agreement amount (cost-shared with consortium): $15,461,499. Government share: $10,000,000.

[35] Andrew Feickert, *The Army's Future Combat System (FCS): Background and Issues for Congress*, 13. Other Transactions Authority (OTA) was established by Congress under Section 845 of the National Defense Authorization Act for FY1994 (10 U.S.C. Section 2371) for research, development, and prototyping, and was intended to permit the government to more readily interact with innovative companies who are not part of the traditional defense contracting community. OTA provides the government with the flexibility to negotiate tailored contracts that are not governed by the Federal Acquisition Regulation (FAR). As originally enacted, OTA was intended for companies that may not have the staff or resources to operate under the FAR which has numerous administrative and reporting requirements that may be beyond the capability of smaller companies.

[36] Don Kroening and Mike Coville, History of Future Combat Systems (FCS) Supporting Analysis, produced by Booz Allen Hamilton for the Army Capabilities Integration Center (Forward) in support of Statement of Work (SOW) Para 2.0 Task Six under Contract GS-23F-0025K, BPA # DASW01-03-F-1055, 24-25.

[37] Andrew Feickert, *The Army's Future Combat System (FCS): Background and Issues for Congress*, 4.

[38] The FCS agreement, subject to negotiations, has an expected value of $154 million, which represents a portion of the program, which is estimated at $4 billion over the next five years. The Defense Advanced Research Projects Agency (DARPA), working with the Army, is the contracting agency. Boeing Archived News Releases downloaded from http://www.boeing.com/defense-space/bctm/news/archive.html March 3, 2010.

[39] COL(R) Marion Van Fosson, Army Program Manager FCS (April 1, 1999 to July 1, 2001), e-mail message to the author, March 9, 2010.

[40] GAO Report, *Defense Acquisitions, Role of Lead Systems Integrator on Future Combat Systems Program poses Oversight Challenges*, GAO-07-380, June 2007.

[41] Boeing Press Release "Boeing-SAIC Team Selected for US Army's Future Combat Systems Program," (March 7, 2002), http://www.boeing.com/defense-space/bctm/ news/archive.html (accessed march 25, 2010). The release stated "as the LSI, we [will] look across all of industry to find the best solution for each part of the program."

[42] "Future Combat System Begins to Take Shape: Army-DARPA Program Garners Attention in Wake of Crusader Cancellation," *National Defense*, July 1, 2002.

[43] Ibid.

[44] DOD Instruction 5000.2, Operation of the Defense Acquisition System, May 12, 2003. This instruction was updated in 2008, however, the FCS program was governed by this version of 5000.2.

[45] Joint Capabilities Integration and Development System Manual, Enclosure B, KPPs are those attributes or characteristics that are considered critical or essential to the development of

an effective military capability that make a significant contribution to the characteristics of the future joint force.

[46] GEN Peter Pace, "Future Combat Systems (FCS) Operational Requirements Document (ORD) Key Performance Parameters (KPPs)" Memorandum for the Under Secretary of Defense for Acquisition, Technology and Logistics, May 13, 2003 JROCM 111-03.

[47]GEN William Wallace, Commanding General Training and Doctrine Command, to Chief of Staff, US Army "C-130 Transportability Requirement," Jan 7, 2008.

[48] Ibid.

[49] Under Secretary of Defense E.C. Aldridge, Jr., "Future Combat Systems (FCS) Acquisition Decision Memorandum" memorandum for Secretaries of the Military Departments, Washington, D.C., May 17, 2003.

[50] DoD Instruction 5000.2, "Operation of the Defense Acquisition System," May 12, 2003.

[51] Aldridge, Jr., "Future Combat Systems (FCS) Acquisition Decision Memorandum, May 17, 2003.

[52] Mr. Scott Davis, Deputy PEO, Integration, e-mail message to author, March 22, 2010.

[53] Feickert, Andrew, *The Army's Future Combat System (FCS): background and Issues for Congress*, 9, fn. 17, "Section 8109 of Report 108-622. Conference Committee Report, FY 2005 Defense Appropriations, July 20, 2004."

[54] Ibid.

[55] MAJ Kirby Beard, MAJ Jeff James and MAJ Vincent J. Tolbert, "Future Combat Systems Creates Cannon and Mortar Synergy," *Army Acquisition, Logistics &Technology Magazine*, April-June 2008, 44.

[56] Ann Roosevelt, "FCS Contract On Track: Army Acquisition Chief, *Defense Daily*, Nov. 17, 2003 (Potomac).

[57] GAO Report, "Defense Acquisitions, Role of Lead Systems Integrator on Future Combat Systems Program poses Oversight Challenges," GAO-07-380, June 2007.

[58] Baumgardner, Neil, "Bolton Forwards GD-Untied Defense Team proposal to DARPA," *Defense Daily*, Jan 9, 2003.

[59] Ibid.

[60] Ibid.

[61] U.S. Congress, House of Representatives, House Appropriations Committee, Subcommittee on Defense, Rep. John P. Murtha Holds a hearing on Defense Procurement, 111th Cong., 1st sess,. May 20, 2009. Secretary Gates also explained his objections to the MGV design. He said it had a flat bottom and was 18 inches off the ground.

[62] Army and Boeing-SAIC LSI Sign $14.8 Billion SDD Contract For Future Combat Systems**,** *Defense Daily*, Dec. 12, 2003 (accessed Jan 28, 2010).

[63] Andrew Feickert, *The Army's Future Combat System (FCS): Background and Issues for Congress*, CRS Report for Congress, (Washington, D.C., Congressional Research Service, May 5, 2006), 9.

[64] Feickert, Andrew, *The Army's Future Combat System (FCS): background and Issues for Congress*, 3-4.

[65] Mr. Scott Davis, Deputy PEO, Integration, e-mail message to the author, March 22, 2010.

[66] Ibid.

[67] Gregory R. Dahlberg, Acting Secretary of the Army and General Eric K. Shinseki, United States Army Chief of Staff, "Charter," Objective Force Task Force, March 6, 2001.

[68] LTG John Riggs, "The Objective Force: A Holistic Approach to Army Transformation," *Army Acquisition Logistics &Technology Magazine*, March-April 2003, The US Army Professional Writing Collection, http://www.army.mil/professionalwriting/volumes/volume1/july_2003/7_03_4v1.html (accessed March 16, 2010).

[69] COL Charles Stafford, e-mail message to author, March 24, 2010.

[70] MG Robert M. Williams, "Your Next Tank," *Armor Magazine*, July-August 2007, 4.

[71] TRADOC Pamphlet 525-5, "A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century," August 1, 1994; TRADOC Pamphlet 525-3-0, "The Army in Joint Operations, The Army's Future Force Capstone Concept 2015-2024," April 7, 2005; TRADOC Pamphlet 525-3-0, "The Army's Future Force Capstone Concept, Operational Adaptability: Operating under [sic] Conditions of Uncertainty and Complexity in an Era of Persistent Conflict 2016-2028," December 17, 2009.

[72] Forward to the Capstone Concept from the Commanding General, Training and Doctrine Command, GEN Kevin P. Byrnes, April 7, 2005.

[73] Capstone Concept, April 7, 2005, 37-38.

[74] Ibid.

[75] Ibid., 34.

[76] Ibid.

[77] Capstone Concept, December 17, 2009, 6.

[78] *Making Strategy: An Introduction to National Security Processes and Problems*, Chapter 11, August 1988, Air University Press, p. 163–174. (accessed Feb 28, 2010), http://www.au.af.mil/au/awc/awcgate/readings/drew1.htm. It further states that "Doctrine has

many functions. Its first function is to provide a tempered analysis of experience and a determination of beliefs. Its second function is to teach those beliefs to each succeeding generation. Its third function is to provide a common basis of knowledge and understanding that can provide guidance for actions. All three of these functions come to fruition in doctrine's relationship to strategy decisions."

[79] Carroll Kimm, "Army Doctrine Leaders Forecast Future Technology, Leadership Needs" http://www.army.mil (accessed Feb. 28, 2010).

[80] Capstone Concept, December 17, 2009, 16.

[81] Ibid.,17

[82] Ann Roosevelt, "Army View of Operational Environment 'Not Significantly Changed,' Casey Says" *Defense Daily*, Jan 29, 2010.

[83] Ibid.

[84] Col. A.T. Ball and Lt. Col. Berrien T. McCutchen Jr., "Task Force ODIN Using Innovative Technology to Support Ground Forces," *Digital Video & Imagery Distribution System*, Sept 20, 2007 (accessed March 16, 2010).

[85] Sydney J Freedberg, "The Army Looks Beyond Afghanistan," *National Journal* (Washington, D.C.) Dec. 11 2009.

[86] Ibid.

[87] Andrew Feickert, *Mine-Resistant, Ambush-Protected (MRAP) Vehicles: Background and Issues for Congress*, Washington, D.C., Congressional Research Service, August 3, 2009, 5-6.

[88] Paul McLeary, "Pentagon M-ATV Benefits from MRAP Problems," *Aviation Week*, Dec. 8, 2009.

[89] Tony Perry, "Marine Assault Vehicle Key to Afghan Strategy," *Los Angeles Times*, Jan 31, 2010.

[90] Ibid.

[91] "General Dynamics to Design Future Stryker Under $203 Million Award," *Defense Daily* (Potomac) Dec. 4, 2009.

[92] "BAE Systems Unveils Upgraded Paladin Vehicle," *Defense Daily*, Jan 21, 2010. The Paladin Integrated Management (PIM) vehicle replaces the out-of-date chassis components with up-to-date components from Bradley Combat Systems.

[93] U.S. Department of the Army, *US Army Weapon Systems 2010* (Arlington, VA: U.S. Department of the Army): 14.

[94] Freedberg, "The Army Looks Beyond Afghanistan."

[95] LTG Robert P. Lennox, Deputy Chief of Staff of the Army, G-8 and LTG William N. Phillips, Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology and Dr. David M. Markowitz, Director, Capabilities Integration, Prioritization and Analysis, HQDA ODCS G-3/5/7 Statement before the Subcommittee on Air and Land Forces Committee on Armed Services, United States House of Representatives on *Army Acquisition and Modernization Programs*, 111th Cong., 2nd sess., March 10, 2010, 9.

[96] Ibid.

[97] Ibid.

[98] Freedberg, "The Army Looks Beyond Afghanistan."

[99] U.S. Department of the Army, *Army Campaign Plan 2010*, Final Draft (Washington, D.C. United States Department of the Army, March 18, 2010): T-6.